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EXAMINER	
POPA, ILEANA	

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1633	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/148,234	MOUTSATSOS ET AL.	
	Examiner	Art Unit	
	ILEANA POPA	1633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *24-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____ .

DETAILED ACTION

1. Claims 1-23 and 29 have been cancelled.

Claims 24-28 are pending and under examination.

2. All rejections pertaining to claim 29 are moot because Applicant cancelled the claim in the reply filed on 09/22/2009.

Response to Arguments

Claim Rejections - 35 USC § 112, 1st paragraph - enablement

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 24-28 remain rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Factors to be considered in determining whether a disclosure meets the enablement requirement of 35 USC § 112, first paragraph, have been described by the court in *In re Wands,* 8 USPQ2d 1400 (CA FC 1988).

Wands states on page 1404,

"Factors to be considered in determining whether a disclosure would require undue experimentation have been summarized by the board in Ex parte Forman. They include (1) the quantity of experimentation necessary, (2) the amount of direction or

guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skills of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims."

While determining whether a specification is enabling, one considers whether the claimed invention provides sufficient guidance to make or use the claimed invention, if not, whether an artisan would require undue experimentation to make and use the claimed invention and whether working examples have been provided.

The instant claims are drawn to a method of inducing organized, functional bone formation at a site of bone infirmity by implanting BMP-2-expressing (i.e., secreting) MSCs in the absence of a support osteoinductive matrix. However, neither the instant specification nor the art is enabling for the present claimed invention for the reasons discussed below.

In making the instant rejection, the following are noted:

An osteoinductive matrix is by definition a matrix comprising osteoinductive factors; adding osteoinductive factors to non-osteoinductive matrices results in osteoinductive matrices (see Wolfe et al., Med. Prog. Technol., 1994, 20: 155-168, of record; p. 158, column 2, p. 159, column 1). Once in contact with MSCs genetically engineered to express and secrete BMP-2, non-osteoinductive matrices necessarily become osteoinductive and implanting such matrices is necessarily implanting MSCs in the presence of an osteoinductive matrix. Therefore, by reciting implanting in the absence of an osteoinductive matrix, the claims practically recite implanting MSCs in the absence of any matrix (i.e., implanting MSCs alone). Inducing organized, functional

bone formation at a site of bone infirmity by implanting MSCs without a matrix is not enabled by the art or the instant specification.

Bone formation cannot occur by simply implanting BMP-expressing MSCs in the absence of a support matrix (see Wolfe et al., p. 159). The art clearly teaches that organized, functional bone formation requires retaining the cells and the factors secreted by the cells for a sufficient time to promote repair and bone growth, which can be accomplish only by using a support matrix. For example, Bruder et al. (J Cell Biochem, 1994, 56: 283-294, of record) teach:

> "In order to effect osseous repair in a local defect, the cells must be delivered to the site in an appropriate carrier. We envision the ideal vehicle as biocompatible to minimize inflammation, osteoconductive to foster integration, resorbable to promote its own replacement, supportive of mesenchymal stem cell attachment and porous to facilitate rapid vascularization. In many ways, this vehicle would functionally resemble hypertrophic cartilage of the growth plate or fracture callus".

Along the same lines, Leach et al. (Expert Opin Biol Theor, 2004, 4: 1015-1027, of record) teach:

> "Transplantation of bone-forming cells to a repair site can promote bone regeneration by direct participation of these cells in bone formation and by the release of osteoinductive factors by these cells.
>
> The infusion or injection of transplanted cells is limited due to their potential to migrate away from the repair site, apoptosis or necrosis. Physical association with carriers in various forms has proven to be an effective means for maintaining bioactive factors and cells at the desired location for prolonged time."

Therefore, the art teaches that organized, functional bone formation cannot take place by simply implanting cells without a matrix.

Additionally, the instant specification fails to provide sufficient guidance for a skillet artisan on how to perform the claimed method. The specification provides only two examples of transplanting BMP-2-expressing cells without indicating whether a

support matrix is used or not. Example 1 is directed to implantation into the abdominal muscle and not to a site of bone infirmity and therefore provides no guidance of how to induce functional bone formation at a site of bone infirmity by implanting cells in the absence of a support matrix. Example 2 is related to transplantation of cells into a 3 mm bone gap. However, Example 2 only discloses that BMP-2-expressing cells are localized at the gap site one week after transplantation; there is no evidence that functional bone formation occurred. The remaining Examples all teach the use of collagen sponges comprising BMP-2 (i.e., osteoinductive matrices). Therefore, the specification does not teach how to induce organized, functional bone formation by implanting the cells without an osteoinductive matrix at a site of bone infirmity. The art does not teach such. In fact the art teaches that functional bone formation requires osteoinductive matrices to bridge gaps larger than 1 mm (see Vaccaro et al., Spine J., 2002, 2: 206-215, p. 207, column 1 and paragraph bridging columns 1 and 2). It is noted that even Applicant's own work (i.e., Moutsatsos et al., Molecular Therapy, 2001, 3: 449-461, of record) provides evidence that only co-implantation with an osteoinductive matrix leads to the induction of functional bone formation (p. 455, column 1; p. 458, columns 1 and 2; p. 459, column 2; p. 460, column 1). Interestingly, Moutsatsos et al. described the same experiment as the one disclosed in Example 2 and demonstrate that only the use of an exogenously added osteoinductive matrix leads to the healing of 3 mm gaps. Based on these teachings in the art and the lack of demonstration of functional bone formation in Example 2, one of skill in the art would not recognize that a gap of 3 mm could be healed by implanting BMP-2-expressing cells

without a matrix. One of skill in the art would not recognize that implanting BMP-2-expressing MSCs in the absence of a support would lead to organized, functional bone formation as claimed. In conclusion, it is considered that the invention, as presently claimed is not enabled.

Applicant traversed the instant rejection on the grounds that Wolfe et al. define "Osteoinduction" as "the formation of new bone by the active recruitment of host pluripotent cells that differentiate into chondroblasts and osteoblasts" (Wolfe et al., page 155, left-hand column starting 3 lines from the bottom to first line of right-hand column). The osteoinductive demineralized bone matrix (DBM) implants described in Wolfe et al. on pages 158-159 are not collagen sponge carriers of the subject Invention. Wolfe et al. describe collagen as a delivery vehicle "incapable of inducing osteogenesis in vivo" (Wolfe et al. page 160, left-hand column lines 8-9 from the bottom of the page). Thus, contrasting the Examiner's assertion, Wolfe et al. discloses that a collagen sponge is not osteoinductive as it does not form new bone by the active recruitment of host pluripotent cells.

Moreover, Examples 3, 8, 9, 11, 14 and 15 corroborate the disclosure of Wolfe et al. that a collagen sponge is not osteoinductive. Experimental controls implanting collagen sponge alone or collagen sponge loaded with cells/virus not expressing BMP-2 reveal a lack of cell differentiation or bone formation in the absence of BMP-2. The skilled artisan would therefore recognize that the collagen sponge carrier of the subject Application is not osteoinductive.

Applicant disagrees with the Examiner's assertion that any implant becomes osteoinductive when it contains osteoinductive factors, and therefore a collagen sponge is osteoinductive.

Applicant states that subject claims relate to methods of inducing bone formation at a site of bone infirmity in a human comprising (a) transforming cells with DNA encoding an osteogenic protein (BMP-2); (b) culturing these cells under conditions that enable expression of BMP-2; and (c) implanting these cells at the site of bone infirmity in the absence of exogenously supplied osteoinductive matrix.

Applicant asserts that the inherent properties of the collagen sponge as an inert delivery vehicle, as described supra, are not modified by mounting cells expressing an osteoinductive protein onto the sponge. In support, Wolfe et al. points out that it is the osteogenic proteins that are responsible for the osteoinductive capacity of demineralized bone matrix implants; Wolfe et al. further describes other non-osteoinductive carrier substances to include collagen. In particular, Wolfe et al. states "solid collagens in a sponge-like form were used for the first time to function as a delivery system for an osteoinductive substance". (See, Wolfe et al. Abstract; pages 158-160; page 160 last line in left-hand column to lines 1-2 of right-hand column). Thus, the collagen sponge itself is not and does not become osteoinductive but acts as a delivery vehicle for cells expressing an osteoinductive protein.

Use of a non-osteoinductive matrix such as a collagen sponge, is described in the subject Application as being "for supporting the composition and providing a surface for bone, cartilage, muscle, nerve, epidermis and/or other connective tissue growth ....

The matrix may provide slow release of the expressed protein and differentiated cells and/or the appropriate environment for presentation thereof" (paragraph 17). Further, "The choice of matrix material is based on biocompatibility, biodegradability, mechanical properties, cosmetic appearance and interface properties" (see subject Application, paragraph 18). Applicants emphasis that implantation of mesenchymal stem cells (MSC) expressing osteogenic growth factor BMP-2 with a non-osteoinductive matrix, such as a collagen sponge, provides a mechanism of delivery of cells possessing paracrine and autocrine properties and which express an osteogenic BMP-2 protein to a site of bone infirmity. Osteoinductive properties/activities observed in segmental defects, for example, are provided by the osteogenic proteins and the response to these proteins by MSC and surrounding environment/tissue.

Further, contrary to the Examiner's allegation, the use of a collagen sponge as a delivery vehicle, does not entail pre-loading BMP-2 into the collagen sponge prior to mounting cells on the sponge (see Examples 3, 8, 9, 11, 14 and 15). Thus, Applicant maintains the assertion that a collagen sponge carrier is not osteoinductive and therefore, Examples support claimed subject matter of, inter alia, claim 24 (c) "implanting said cultured mesenchymal stem cell in the absences of an exogenously supplied osteoinductive matrix"

The Examiner alleged the reference Moutsatsos et al. Mol. Therapy. 2001 3(4):449- 461, discloses that only co-implantation with an osteoinductive matrix leads to regeneration of functional bone, since there is no teaching in the reference of implanting cells without a matrix. Applicant disagrees.

Moutsatsos et al. describes that regulated expression of "osteogenic growth factor BMP-2" controlled both bone formation and bone regeneration. (See, Moutsatsos et al. Abstract) Moutsatsos et a. state that collagen sponges "were used to deliver the cells into the transplantation site" (See, Moutsatsos et al. page 451, left-hand column lines 32-33). Formation of bone tissue at these sites was dependent on expression of BMP-2 protein, as inhibition of BMP-2 expression in the presence of DOX resulted in lack of bone formation. Further, contrary to the Examiner's assertion that "there is no teaching in the reference of implanting cells without a matrix", Moutsatsos et al. describes that "It is noteworthy that injection of C9 cells [MSC cells expressing BMP-2] directly under the skin had also formed ossicle similar to collagen-delivered C9 transplants." (See, Moutsatsos et al. page 45, left-hand column lines 28-31; Figs. 4e-4j) Hence, like Wolfe et al., Moutsatsos et al. describe a collagen sponge as a matrix to function as a delivery system for an osteoinductive substance. The disclosures of Mousatsos et al. and Wolfe et al., expressing knowledge in the art, support the instant claims wherein a method of bone formation comprises implanting MSC expressing BMP-2 protein in the absence of an exogenously supplied osteoinductive matrix, e.g. a collagen sponge, at a site of bone infirmity. For at least these reasons, one skilled in the art, based on the specification as filed, the guidance provided in the Example, and knowledge in the art will recognize a collagen sponge as a non-osteoinductive matrix.

The Examiner alleged that the specification fails to provide sufficient guidance for a skilled artisan on how to perform the claimed methods alleging "bone formation

cannot occur by simply implanting MSCs in the absences of a support matrix". Applicants disagree.

The instant application describes the DNA coding for osteoinductive proteins and other useful proteins (paragraphs 9, 10 and 11), cells for transformation with DNA (paragraph 13), vectors for expression of DNA (paragraph 14), uses of the instant invention for regeneration of bone (paragraph 16), and use of a combination of cells and a matrix (paragraphs 17 and 18), wherein a matrix is provided as support surface for bone growth. Examples 1, 2 and 13 describe implantation of MSC expressing BMP-2 in the absence of a matrix results in bone induction. Examples 3, 8, 9, 11, 14 and 15 describe implantation of MSC expressing BMP-2 mounted on collagen sponges/gels results in formation of new bone tissue including gap-healing of a radial segmental defect. Thus, the instant application describes and exemplifies bone formation as a result of implantation of MSC expressing BMP-2 in the absence of a matrix and in the absence of an exogenously supplied osteoinductive matrix.

The Examiner alleged that the art teaches bone growth can be "accomplished only by using a support matrix" (Bruder et al. and Leach et al.). Applicant disagrees.

Bruder et al. presents hypotheses and rules that "that appear to govern all processes involving MSC-medicated bone formation" (see Bruder et al. Summary page 292). In stark contrast, the subject Application exemplifies bone induction in the absences of a matrix (Examples 1, 2 and 13). Moreover, as argued supra, the disclosure of Moutsatsos et al. Mol. Therapy, 2001, supports this result.

Applicant asserts that while Leach et al. may suggest association of cells with carriers to be effective in bone formation, Leach et al. no where state that growth can be accomplished by using a support matrix, as stipulated by the Examiner. In fact, Leach et al. states that "Systemic infusion or injection of inductive factors can be successful" in bone regeneration (see Leach et al. page 1016, fight-hand column, lines 2-3).

For at least these reasons, one skilled in the art, based on the specification as filed, the guidance provided in the Example, and knowledge in the art will recognize the potential for bone formation by implanting MSCs in the absence of a matrix.

The Examiner alleged that the instant specification and Examples fail to provide sufficient guidance for a skilled artisan on how to perform the claimed methods in that the Specification provides only two examples (See Office Action page 4). Applicants disagree. Applicant directs the Examiner's attention to Examples 1-15 described in the subject Application, as briefly described below:

Example 1 describes the ability of MSC expressing BMP-2 to develop into newly formed ectopic bone in the absence of a matrix.

Example 2 describes in vitro and in vivo regulated expression of BMP-2 in MSC demonstrating in vitro BMP-2 expression, in vivo survival of MSC expressing BMP-2 in 3 mm segmental defects.

Example 3 describes MSC expressing BMP-2 and mounted on collagen sponges (non-osteoinductive), further implanted at sites of segmental defects (2.5 ram, 3 ram, 3.5 ram) and observed for up to 6 weeks. Results show newly-formed bone (increased radiopacity) compared with a lack of healing in control groups (collagen only and

segmental defect only). New bone was comprised of bone trabeculas and fatty bone marrow.

Example 4 describes successful viral gene delivery into osteoprogenitor cells.

Example 5 describes comparison of bone formation when implanting cells expressing BMP-2 versus those expressing BMP-2 and parathyroid hormone receptor (PTHR) (autocrine effect). Bone formation was observed with implants expressing BMP-2 but not those expressing BMP-2 and PTHR.

Example 6 describes systemic administration of recombinant BMP-2 in adult mice results in increased physical potency and excluded adverse systemic effects of BMP-2 on the CNS.

Example 7 describes MCS as suitable hosts for in vitro transfection by adenoviral vectors expressing BMP-2.

Example 8 describes cells expressing BMP-2 and mounted on a collagen sponge (non-osteoinductive) were implanted into a 2.5 mm radial segmental defect and observed for 6-8 weeks. Greater gap healing was observed with MSC cells expressing BMP-2 than with CHO cells expressing BMP-2 (CHO lack the ability to differentiate into osteoblasts.).

Example 9 describes cells expressing BMP-2 and studied in vitro (BMP-2 expression) and in vivo (mounted on collagen sponges-non-osteoinductive), implanted into 2.5 mm segmental defects and observed for 6-8 weeks). Results demonstrated BMP-2 in vitro expression and highest values of gap repair and organized bone formation with MSC expressing BMP-2 as compared to collagen sponges alone.

Example 10 describes osteocalcin synthesis stimulated by BMP-2 in bone marrow stromal cells.

Example 11 describes genetic engineering of MSC expressing BMP-2 and enhanced bone repair (organized and oriented bone formation) of three different MSC clones, mounted onto collagen sponges (non-osteoinductive) and implanted into 2.5 mm segmental defects. Observations were carried out over 8 weeks.

Example 12 describes extra skeletal effects of BMP-2 administered systemically.

Example 13 describes the use of encapsulated BMP-2 expressing cells injected into a subcutaneous area in the back and the resultant bone and cartilage formation observed.

Examples 14 describes MSC expressing BMP-2 from an adenovirus and further, transplanting such cells as part of a collagen gel (non-osteoinductive matrix) into a subcutaneous area demonstrated that bone formation was dependent on BMP-2 expression (observed after 10 and 20 days).

Example 15 describes intramuscular transplantation of MSC expressing BMP-2, mounted on collagen sponges (non-osteoinductive) to study effects of paracrine and autocrine responses after 10 and 20 days. Results disclose cell surface receptors affects differentiation pathway of pluripotent cells.

As listed above, and as described in greater detail in the instant specification as filed, the specification clearly provides guidance for a skilled artisan on how to perform the claimed methods. Further, Examples demonstrate successful induction of organized bone formation at sites of bone infirmity upon implanting MSC expressing

BMP-2 in the absence of an exogenously supplied osteoinductive matrix at a site of bone infirmity.

Based on the arguments presented supra, Applicant submits that one skilled in the art, based on the Specification as filed, the guidance provided in the Example, and knowledge in the art will know how to make and use the claimed compositions. Applicants submit that Examples cannot serve to limit the scope of the claimed invention, but serve rather to provide guidance for how to make and use the scope of the claimed invention. Accordingly, Applicant requests the withdrawal of the rejection.

Applicant's arguments are acknowledged; however, the rejection is maintained for the following reasons:

Applicant argues that, based on the Examples and knowledge in the art, one of skill in the art would recognize a collagen sponge as a non-osteoinductive matrix. This argument is not material to the instant rejection and invention, which are both drawn to inducing organized and functional bone formation by providing MSCs capable of secreting BMP-2 and not by providing collagen sponges alone. Similar to the art, Examples 3, 8, 9 and 11 demonstrate that organized and functional bone formation at a site of bone infirmity occurs by implanting osteoinductive matrices and not by implanting collagen sponges alone. Specifically, Examples 3, 8, 9 and 11 demonstrate that, while *per se* they are non-osteoinductive, collagen sponges comprising BMP-2 secreted from the MSCs embedded within become osteoinductive. This is exactly what Wolfe et al. and Moutsatsos et al. teach. For these reasons, Applicant's arguments **(i)** that the

inherent properties of the collagen sponge are not modified by mounting cells expressing an osteoinductive protein onto the sponge or **(ii)** that, as opposed to Bruder et al. who presents hypothesis, the instant specification exemplifies bone formation in the absence of a matrix are not found persuasive.

Examples 1 and 2 have been addressed in the rejection above. None of the Examples 4-7, 10 and 12-15 are drawn to inducing organized and functional bone formation at a bone infirmity site.

Applicant's assertion that the Examiner stated that the use of collagen sponges entails pre-loading BMP-2 has no basis because the Examiner did not state such.

Applicant argues that Moutsatsos et al. teach that implanting MSCs alone under the skin results in ossicle formation. In response to this argument, it is noted that the claims are drawn to the induction of organized, functional bone formation at a site of bone infirmity and not to ossicle formation under the skin, which ossicle are not organized, functional bone.

With respect to Leach et al., they teach that, while systemic infusion can be successful in small animals, such does not work for larger animals and humans and that cells should be implanted in conjunction with carriers (see the full p. 1016). Therefore, they do teach that bone formation in larger animals and humans can only be accomplished by using a support matrix. This is consistent with the teachings of Wolfe et al. and Moutsatsos et al. Therefore, the art as a whole teaches that support matrices are necessary for bone repair.

In conclusion, the instant specification and the art do not support Applicant's assertion that, based on the guidance in the specification, one of skill in the art would know how to practice the claimed method (i.e., inducing organized, functional bone formation in the absence of an exogenously supplied osteoinductive matrix).

For the reasons set forth above, the rejection is maintained.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ILEANA POPA whose telephone number is (571)272-5546. The examiner can normally be reached on 9:00 am-5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Woitach can be reached on 571-272-0739. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ileana Popa/
Primary Examiner, Art Unit 1633